Contact Roe for Quarterly article Roe
Codford Boy J. G. Rogers C. Vancouver, B.C.

BUFFALO TRAILS AND RAILWAYS.

There has been uttered at one time or another, a considerable amount of picturesque but random assertion concerning the supposed origin of our modern highway routes, i.e., previous to automobile days, of course) and even our railways, from trails once followed by the Indians, and adopted by them from buffalo paths. The late Professor A.B. Hulbert might be described - not by any means as the author of this theory, for it is in a vague form much earlier; but as its systematic exponent and champion. In the first two of his sixteen volumes on "The Historic Highways of America" he deals with the paths of the great game animals, principally the buffalo, and with the supposed adoption of these by Indians as the routes of their own so-called'Indian trails'. A short paper is no place in which to attempt an examination of the theory at large. I shall merely note very briefly one or two fatal objections; since they will serve to justify my own attitude of disbelief. Hulbert gathered his data almost entirely in the Ohio Valley region, and applied them to the continent as a whole, without any regard to the endless diversities among Indians in respect of trail-making habits, as well as other things. His detailed demonstration of buffalo-trail-and-railway-routes is confined to <u>one</u> instance only. He fails utterly to recognize - even to mention - the diametrically-opposed principles that govern trail and railway; the one needing high and dry ground; the other clinging persistently to the lowest levels obtainable; and the entirely dissimilar methods that must be followed in crossing, for example, one of those deep gashes across the country which characterize our Western river-valleys in the Plains territory at large. Lastly, his buffalo-and-Indian order of succession is

applied to a region where even his own evidence shows that the Indian reached there first; apart from the fact that this conclusion is accepted by practically every reputable Indianologist on this continent, or in the world.

Long after the appearance of Hulbert's great work, the following appeared (1920) from an historical scholar of high standing, Professor F.J. Turner, which definitely links this theory with Canada. Professor Turner makes no mention of Hulbert, who had not extended his views to cover Canada, in so many words at any rate.

Professor Turner writes:-

> "The buffalo trail became the Indian trail, and this became the trader's 'trace'; the trails widened into roads, and the roads into turnpikes, and these in turn were transformed into railroads. The same origin can be shown for the railroads of the South, the Far West, and the Dominion of Canada...."

Now although the author (rather strangely) did not allude to Hulbert, he did mention an earlier scholar as his authority for this assertion. I shall therefore quote the passage in question, in order that the reader may see upon what flimsy foundations this particular defender of the belief is content to rest his case. It is to be found in Justin Winsor's monumental Narrative and Critical History of America, a masterpiece of combined research. In the eighth volume (p.10) Dr.G.E. Ellis writes, in the course of an important essay on the Hudson's Bay Company, as follows:-

> "These obstructions or carrying-places (i.e. 'portages') of the Indians answer to and were no more annoying to him than are the high grades of our railroads to us...."

The reader may decide for himself whether this very general comparison is sufficient, without some much more precise testimony of fact - not merely of opinion - to justify such a very definite

pronouncement as that of Professor Turner, or of the school of Hulbert at large. It will be the purpose of this article to see how the belief squares with actual historical and geographical facts in Western Canada.

Dr. Ellis' extract, quoted above, is dated 1889; this furnishes a definite starting-point. Now although skulls or other vestiges of extinct fossil species of bison, dating many thousands of years back, have been found in and near Toronto, the historic buffalo have never been found in Canada north of the Great Lakes, or east of Lake of the Woods. In 1889, the only railroads traversing any portion of the known buffalo range in Canada were the main line of the Canadian Pacific and its branch from the International Boundary at Emerson, Manitoba, northward into Winnipeg. It is fairly conclusive, that for practical purposes, we may narrow the statement down to the point that the Canadian Pacific transcontinental route followed buffalo and Indian trails westward across the plains. This is the first concept with which we have to deal. A more recent scholar, John Blue, writing like myself, from Edmonton (1924), puts the case in the following words:-

> "Many of the railway lines and trunk routes of to-day follow some of the old Indian trails. For example, the railway lines west of Edmonton follow the old trail of the Mountain Stoneys. The road of the Canadian Northern from Edmonton to Calgary follows the Blackfeet trail from the Great Plains to Edmonton; and the Canadian Pacific, the Grand Trunk Pacific, and the Canadian Northern main lines from Edmonton To Winnipeg conform in a general way to the trails of the Plain Crees. After traversing this section of the West, the railway lines running north of Edmonton follow some of the most important trails of the Wood Crees....."

The reader will observe that Mr. Blue does not link up these trails with any supposed buffalo origins; but since others have done so, we can deal with both ideas conjointly.

It is of course a well-known historical fact that the first survey for a Canadian transcontinental railway was broadly along the

line of the Fort Garry and Edmonton trail; this was generally the route followed and approved by Sandford Fleming and his colleagues in 1872 and later. With deviations in detail, this is roughly the alignment of the Grand Trunk Pacific from Winnipeg (or Portage la Prairie) to Saskatoon; and of the Canadian Northern from Warman Junction, north of Saskatoon, to Edmonton. These now constitute, respectively, the main line of the Canadian National, and its principal alternative route. But I have been unable to disdover one single fragment of evidence, beyond mere assertion, to connect this with any 'old Indian trail', either of the Plain Crees or any other tribe. It would, in any case, much more probably be the Assiniboines; for the old trader, Alexander Henry, describes this very territory in 1809, as far west as Fort Vermilion (near Vermilion, Alberta), as being 'the lands of the Assiniboines'.

There is no evidence that I have been able to find, of any continuous trail overland from Red River to Edmonton earlier than the fifties. A great deal has been said about the 'converging trails' to such places as Edmonton. These trails 'proved' that the fur-posts had been planted at strategic focal points where the Indians had foregathered from time immemorial; led thither by 'buffalo fords' where the herds had crossed the streams, and so forth. As a matter of historical fact, however, almost all the fur-posts were established by men who had journeyed thither <u>by water</u>, along routes sometimes hundreds of miles distant from the land-routes between the same points. Certainly as late as 1863, and possibly later, the Saskatchewan River route was the 'main line' of the Hudson's Bay Company's traffic between Fort Garry and Edmonton; as it had been in 1840, when Rundle, the first

resident missionary at the latter post, journeyed thither; in 1846, when Paul Kane, the artist, passed that way; and in 1852, when Father Lacombe began his magnificent life-work in Alberta. Father Lacombe himself is generally held to have been the first man to take carts over the trail the entire distance from Edmonton to Fort Garry, in 1857. It is a matter of historical record that one of the most important intervening posts between the two named, namely, Fort Ellice on the Assiniboine (near Lazare, on the Canadian National main line, hard by the Manitoba and Saskatchewan Boundary) was not founded until 1831, to keep the Indians from trading at the American Fur Company's posts on the Missouri. This was on a water-route again; and what would naturally seem to be the earlier of its two overland routes from Fort Garry followed the great bend along the southern bank of the Assiniboine by way of Brandon. If the shorter northern route was already marked out by Indians, why did not the earlier traders follow it? If it was not already marked out by Indians, what becomes of the 'Indian trail' argument?

A similar dilemma confronts us at Edmonton, with its 'converging trails'. The present city of that name is nowhere near the site of the original fur-post. That was planted some twenty-five miles down the Saskatchewan, near the mouth of its tributary, the Sturgeon. Now this might very conceivably be termed a really strategic point, from the angle of men whose easiest mode of transporting heavy goods was by water. For the Sturgeon, by means of a not very long portage of perhaps four miles, provided communication with the Pembina, and thence with the great Upper Athasbascan water-system; the only other being by the tortuous and difficult 'Old Kline's Trail', between Kootenay Plain on

the Upper North Saskatchewan, and Jasper House. But 'Lower' Fort Augustus and Fort Edmonton (two rival posts of the H.B.Company and Northwest Company respectively) were burnt by the Blackfeet in 1807; and were not rebuilt on the same site, being transferred up-river to the present city-location. After the Amalgamation of 1821, they became one, as Fort Edmonton. Now the strategy and the (original) 'converging trails, dating from time immemorial', must presumably have dictated the first choice; if so, why abandon it? The Blackfeet would be just as likely to attack the new post anywhere else. If the second was the really strategic point, why the first selection? And if the second site was really the superior one from this supposed strategic point of view of converging trails and all the rest of it, then Indian-and-fur-trader strategy must appear very strange, in the light of the principles which are thought to have governed it. For they both concentrated on a point where, in order to reach the Pembina, they had either to make an initial portage to the Sturgeon of ten miles to the later St. Albert Mission; or else a water-journey of some fifty additional miles down the Saskatchewan to the Sturgeon Forks near the abandoned post, and back up the Sturgeon again to St. Albert, and on. This furnishes some very strong inferential evidence concerning the modern origin of some of those 'immemorial Indian trails'. Before concluding this article, I shall present some positive evidence, on the very best first-hand authority.

Even if we were to concede for the sake of the argument, the ancient Indian origin of the Western Canadian main fur or cart-trails, there is still no evidence whatever to connect them with buffalo, beyond the mere assertion. For the very same champions of that argument are

also the most strenuous in insisting that the buffalo almost invariably travelled direct north and south. Professor Hulbert somewhat grudgingly admits an occasional exception; as otherwise this would rule out his own chosen buffalo-route par excellence, down the Ohio Valley. Now the general trend of early trails and railways was westward, like the star of empire. We have no record whatever - nor even any assertion of such; the precise contrary rather - of any general westbound buffalo-trails in the Western Plains territory, including in this both Canada and the United States. Only one early Canadian explorer has given any account of the supposed annual migration-routes of the buffalo in Western Canada. This was Professor Henry Youle Hind, who carried out extensive and valuable explorations for the Canadian Government in 1858, in the territory between Fort Garry and the Forks of the Saskatchewan, near Prince Albert; at the same time that the Palliser Expedition was working farther westward. Hind gives an itinerary of the annual movements of what were termed the 'two great herds' of the Canadian West, which is too long for quotation; it may be found in his Report of 1858, or in his somewhat less formal and more chatty Narrative of 1860. This account is based upon the information of his half-breed guides and packers. It is practically worthless in itself, since it is contradicted not only by the matured conclusions and day-to-day records of many experienced observers like our own John McDougall, but also by the actual experiences of Hind himself, on this very trip in question. For if an annual migration, following a regular and well-known route, can be said to have any meaning at all, it must surely mean that buffalo-hunters conversant with these facts would know precisely where to find buffalo at any given season of the year. Yet Hind's party would have starved had he not prudently purchased an ox before leaving Fort Garry, 'lest the buffalo should fail them'; on the

advice of people who knew, like old Alexander Ross, the early historian of the Red River Settlement, that going after buffalo was 'taking a leap in the dark', as he puts it. The point for our present purpose is, that even had the half-breeds' account of the buffalo movements proved to be accurate, the only relation their stated route bears to the Fort Garry and Edmonton trail is, that the buffalo crossed the latter at a point which is given as 'somewhere west of Fort Ellice'; possibly in the Spy Hill or Cut-arm Creek locality, where the Canadian National main line regains the prairie level, after its climb from the Assiniboine Valley.

Even if the assumptions in the foregoing were granted in toto: that the Fort Garry-Edmonton Trail, the later route of the Canadian National lines, was previously an Indian trail, and originally a buffalo path; does this prove anything at all for the only railway in Western Canada in 1889 - the Canadian Pacific main line via Brandon, Regina, and Calgary? We have some most interesting and quite specific evidence concerning the early 'trail-lessness' of this route, from unexceptionable authorities, themselves eye-wittnesses or participants. If we reject their testimony, we may as well reject any and everything that was ever written in any land, or in any age.

While it is well known that the original survey for Canada's first transcontinental railway was abandoned for a somewhat more southerly route by way of Brandon and Moose Jaw, other details of the change are perhaps not so well known; since I have found them in one book only, among many that have been written on the subject. That book is the Autobiography of the late Professor John Macoun. We may accept this implicitly, unless we are prepared to reject everything else Macoun

ever wrote; for it was on his representations - so he tells us - that the Bow River route via Calgary was finally adopted. The line had been surveyed and partially constructed as far west as Moose Jaw Creek by the spring of 1881; and the chiefs of the then newly-organized Canadian Pacific Railway (including at that time the notable 'Jim Hill', later of the Great Northern) favoured the idea of the route extending from Moose Jaw to Battleford, and thence to Edmonton and onward via the Yellowhead Pass. Macoun was summoned to meet them; and as a result of the interview - he was later told so in so many words by Sandford Fleming, the Government's chief engineer - the route via Calgary and the Bow River was decided upon, 'if they could find a pass.'

Now the first of these respective routes is almost precisely the one followed by Palliser's party in their first season, 1857; from somewhat westward of Moose Jaw Creek, by way of the Elbow of the South Saskatchewan (near Outlook, Sask.), northward to Carlton. As the season was getting late, Palliser, to save time, decided to aim directly for Carlton by compass; instead of cautiously working his way along the eastern bank of the river, as his so-called 'guides' timidly wished, until they reached the crossing (later 'Clark's Crossing') of the track from Ellice to Carlton. He describes very graphically their half-consternation, half-derision, at the suggestion to trust themselves to a glass toy across a trackless waste - which it proved to be, apart from occasional confusing labyrinths of buffalo trails; and their utter discomfiture when he led them to the edge of a hill one fine morning, and showed them Carlton beneath them.

Evidence concerning the final route actually adoped is equally explicit. The first white people to settle in the Bow River Valley at

Morley, since the very short duration of Old Bow Fort in the close vicinity (about 1832), were John McDougall and various members of his family, who founded the well-known mission at that place in 1873. McDougall, Lacombe, and Father Scollen were the only men who dare enter the Blackfoot country, except at the imminent risk of their lives; and McDougall's own friends and relatives, the Hudson's Bay men at Edmonton, stood aghast at his proposal to go and live there. There can be no better authority for the region than such a man, whose name was a household word among the three principal families of Indians whose languages he spoke, and with so much of whose knowledge he was familiar. McDougall tells us that in the spring of 1876, his trader-brother, David McDougall, took his winter's 'trade' of furs from Morley to Fort Garry by a new route as far as Fort Qu'Appelle, over the later route (says McDougall himself) of the Canadian Pacific Railway. At this time there was no trail; David McDougall being himself the first to break one. There is an important Canadian National line, known as the 'Goose Lake Line", which runs from Saskatoon via Kindersley and Hanna to Calgary. John McDougall records also that in 1875, one year previous to his brother's journey, he and his father travelled that way to the Crossing (near the modern Saskatoon) en route to Fort Garry. For the entire distance they had no trail of any kind. If there was any trail in that direction from time immemorial, who was more likely to know of it or better able to discover it? It is probable that this roundabout journey may have led David to decide that if he had to break a new trail for himself, he might as well do so on a direct route.

There is no better-known place-name in Alberta than Blackfoot Crossing, 'the ridge under the water', on the Bow River, near Gleichen,

some sixty miles or so below Calgary. In August and September, 1877, Lieutenant-Governor Laird made an important journey thither from Battleford to confer with the Blackfoot chiefs. On the theory of any buffalo-and-Indian processes of strategic selection, of course Battleford itself, at the confluence of the Battle and Saskatchewan Rivers, would be a notable example of this. A trail thence to the actually-famous Blackfoot Crossing (particularly when this so nearly conforms to the orthodox north-and-south direction) would be of the very essence of this trail theory. Yet in a minutely detailed report there is not one single reference to a trail of any kind.

With reference to the three direct railway routes from Winnipeg to Edmonton 'conforming in a general way' to the trails of the Plain Crees, a little more precise comparison is highly instructive. We shall find that the conformity was much more general than particular. All three pass through Portage la Prairie, some 50 miles or so west of Winnipeg. As I have said, the (former) Grand Trunk Pacific, from Portage to Saskatoon, is the nearest to the old cart trail from Red River to Edmonton. This may be used as the datum. At Melville, Saskatchewan, the second divisional point, 279 miles from Winnipeg, the Canadian Pacific at Yorkton is 26 miles northward; and the (former) Canadian Northern at Canora is 55 miles northward, on an angle of about 100 degrees. These distances apart are maintained with slight variations plus or minus but a gradual diminution, until near Saskatoon, where the two first named converge on the city. The Canadian Northern direct line passes by Warman Junction, 14 miles north; and thence to Edmonton it is much the nearest to the old cart trail, via Fort Pitt, although still a considerable distance away.

From Saskatoon westward, the Canadian Pacific and Grand Trunk

Pacific routes are fairly close together for over 120 miles; the Canadian Northern at North Battleford - on a line from 60 to 70 miles west of Saskatoon - being over 50 miles distant. From the point where the two former cross, just west of Unity, Saskatchewan, they diverge rapidly; the Canadian Pacific making for a junction with its Calgary and Edmonton line at Wetaskiwn, 40 miles south of Edmonton; while the Grand Trunk Pacific and Canadian Northern proceed directly to that city. The Grand Trunk Pacific at Wainwright, its last divisional point, 127 miles east of Edmonton, and the Canadian Northern at Vermilion, its last divisional point, 130 miles east of Edmonton, are 47 miles apart in a straight line. This is not at a true right angle of 90 degrees; as the road-allowance runs north, and the railway at Wainwright is running about west-north-west. The Canadian Pacific at Hardity - also the last divisional point - is some 23 miles to the southward; continuing to diverge irregularly all the way to Wetaskiwin, where it turns north to Edmonton. Bremner, on the Grand Trunk Pacific, 12 miles from Edmonton, and Fort Saskatchewan on the Canadian Northern, 17 miles from Edmonton, are exactly 10 miles apart by road-allowance, direct north and south. I think it will be agreed that distances apart, varying from forty to sixty miles as the crow flies, constitute a very strange case for conformity, however 'general' it might be.

So also with the routes west of Edmonton which 'follow the old trail of the Mountain Stoneys'. Prior to their amalgamation as part of the Canadian National system, there were two railways running west of Edmonton through the Yellowhead Pass. There are still the two as far as the Pembina River, some sixty miles westward. For practically the whole of that distance these are several miles apart, with a chain of

lakes between them; that very fact being the precise reason why these were both retained while closer duplications have been abandoned. Which of these two followed the old trail of the Mountain Stoneys?

In so far as the railways north of Edmonton are concerned, they offer little better support to the buffalo-and-Indian-trail theory. Some ninety miles northwestward from Edmonton was the old trading post at Fort Assiniboine, on the Athabasca. Hector and Palliser were there in 1858; and they note an 'old Indian trail' from Fort Edmonton to that place, much obstructed at that time by fallen timber. This may or may not have been an Indian trail actually but it was the Hudson's Bay men's route to Lesser Slave Lake and beyond, by land; for Macoun and Horetzky the engineer, travelled by that in 1872, in company with certain H.B. employees proceeding to their posts. Two of the four railway routes extending northward from Edmonton have Lesser Slave Lake as an actual or ultimate objective: and they pass roughly equidistant from Fort Assiniboine on either side, some twenty-five or thirty miles away in each instance.

In the case of the lines from Edmonton to Lac la Biche and Athabasca respectively, for the reasons I have already mentioned we cannot even decide with any certainty whether the 'earliest trails to Edmonton' (i.e. Fort Augustus) in the days of the <u>ancien regime</u> on the Saskatchewan, were to the Lower or the Upper fort of that name. The balance of probability is in fact in favour of the earlier establishment; since what is commonly termed the 'old trail' up Redwater Creek, the tributary next below the Sturgeon, and heading toward Lac la Biche, could easily lead southward, either to the old Snake Portage (whence supplies were taken to Lac La Biche by pack-horse); or to the abandoned Lower Fort

Augustus. From neither place do any railways proceed in any direction.

There is one other route mentioned in the passage quoted from Mr. Blue; in this case it is quite true that trail and railway are fairly close neighbours for a considerable distance. I hesitate to use the term 'follow'; since in this particular relationship it implies a connotation which is not necessarily true at any time, and which is historically untrue concerning this very route in question. This is what is known as the 'Short Line' between Edmonton and Camrose, Alberta, on the Canadian Northern; being now a part of the Canadian National system. This is the one mentioned by Mr. Blue as 'following the Blackfoot trail from the Great Plains to Edmonton'. Its general direction does lie along one of the various 'Blackfoot Trails'; the one sometimes known as the Hay Lake Trail, Hay Lake being now a town on the railway line. Now the town of Camrose came into existence about 1904, when the Canadian Pacific commenced the branch eastward from Wetaskiwin which ultimately became its through line between Winnipeg and Edmonton, whose general route has been outlined above. It has never even been suggested that this route followed the general alignment of any buffalo-and-Indian trail; andI have found no vestige of evidence of any recognized (i.e. repeatedly -used) trail in that direction. As a matter of topography, Wetaskiwin lies practically on the edge of the open plains country, the 'short-grass region'; where Indian hunting-parties, who might conceivably have followed some fairly usual route from, say, the Pigeon Lake region to the westward, would disperse in any direction promising buffalo, and perhaps never in precisely the same one. It is interesting to note that in the vicinity of Pigeon Lake itself, John McDougall, en route from Edmonton in 1865, notes an utter absence of trails; and had

to find his way by climbing trees and scanning the country. There can be little reasonable doubt that Camrose owed its selection, not to trails, but to certain definitely-accepted and perfectly well-known engineering principles governing single-track railway lines. For station sites these are, a level grade, if practicable; a straight alignment with freedom from heavy earthworks; and a maximum average distance one from another of not more than about seven miles. In general conformity with these qualifications, beyond doubt, Camrose was placed where it is; and if this coincided with it being a crossing of trail and railway, nearly at a right angle, in 1904, this in no way invalidates my contention.

The main line of the Canadian Northern reached Vegreville, 75 miles from Edmonton, in 1905; and that of the Grand Trunk Pacific reached Tofield, 41 miles from Edmonton, in 1909. The two companies each projected a branch from those respective points to Calgary. The growth and importance of Camrose, as the centre of one of the very finest sections of Alberta, together with the fact that it lay in a reasonably direct line toward their objective, resulted almost inevitably in both branches passing through the town. In fact, it is not impossible that the boot may actually have been on the other foot. The geographical situation of Camrose, looking toward Calgary, may have been the real reason for the selection of the two junction points named, for the initial divergence from their respective main lines.

The distance from Edmonton to Camrose via Vegreville is 117 miles, and 67 miles via Tofield; by the 'short line' it is only 55 miles. One cannot wonder that the Canadian Northern should seize the opportunity to build the direct line, which incidentally tapped a good unopened

country. Quite incidentally also, it chanced to lie broadly along the route of the old trail. Just what support this may be thought to furnish to the traditional concept of 'following an Indian-and-buffalo trail,' the reader may decide for himself. And if an engineer can deviate from such any farther than he can see - or at all - not to say for thirty or forty miles, why can he not lay out a route entirely independent of such forerunners and 'guides'? I have little doubt that other supposed 'followings' of this character would resolve themselves into something very similar, if carefully investigated.

II.

These buffalo-and-Indian routes were not merely 'followed', however, in that casual sense in which we follow somebody else's choice, whenever we take the most aimless stroll along a city street. They were deliberately selected by men of skilled scientific training, as ways upon which (to quote Hulbert's expressions) 'our theodolites placed their stern stamp of approval; which the tripod of the white man cannot improve upon.' I have shown in my foregoing remarks the utter lack of evidence of any character for these assumptions of 'following' (be the reasons for so doing what they may) in a number of railway routes actually specified by name. In this concluding portion of this article I wish to draw attention to some railway routes that actually have followed in the tracks of the buffalo. There is no evidence whatever that this was done in the deliberate sense to which I have referred; neither is there any hint of evidence that those responsible for such choices had even so much as heard of the buffalo-and-Indian theory. In the case of the most important one there is a vast amount of highly contradictory assertion concerning the reasons for the selection;

but buffalo are not included among them. For these reasons, I am decidedly of the opinion that buffalo-and-Indian predecessors had no influence in the choice. At the same time, it is perfectly certain that the Hulbert and Turner school of thought would seize on these as examples to prove that because the buffalo had been followed chronologically. I shall therefore take them at their word for the moment; and we shall see what the consequences were to the railway builder, and just how much reliance can be placed on the buffalo as an 'incomparable engineer of nature'. Finally, I shall endeavour to explain as accurately as may be in my power, the exact character of one of these 'buffalo coulees' which has actually been utilised by one of our railway lines; in order to make as clear as possible to the reader just how much relationship exists between the phraseology and the facts.

Twenty years or so before Hulbert, an English scholar, Thorold Rogers, wrote the following, which I quote preferably, in illustration of this particular aspect of the buffalo theory; since it sums up the case much more tersely and concisely than any one short passage of Hulbert's, notwithstanding that in detailed exposition, the latter scholar remains its chief interpreter., Rogers writes:-

"....I have little doubt that some of the principal English roads date from the times in which primitive races settled in this country, if they were not the tracks of wild animals before man adopted and used them. So, in the far west of the United States, the buffalo track, well worn by the regular migrations of the animal, becomes an Indian trail, a mountain or country road, and is constantly adopted, at last, as the line on which a railroad should be constructed. The instinct of the animal and the shrewdness of the savage, only a little higher in intelligence than the animal, have planned roughly the survey

which engineering skill examines and frequently approves....."

Statements of this general character would carry more conviction were it not that local investigation in the buffalo country reveals the fact that the buffalo tracks are found, not only along feasible approaches which engineering skill 'frequently approves', but also along impossible ones which no engineer in his senses would dream of approving. So that in the final analysis - even as postulated by the most devout Hulbertian - the ultimate choice has to be that of the engineer and not the buffalo. This I shall show in more detail before concluding.

I have instanced the fact above, that the original survey for the first Canadian transcontinental railway was through the Yellowhead Pass, now used by the Canadian National system. The lowness of this pass was remarked by Milton and Cheadle in 1863. Its approach up the Miette Valley from Jasper to the summit reminded them - not inaptly in my own opinion, having travelled through both - of the Vale of Todmorden in England, along which the Lancashire and Yorkshire L.M.S. runs between Sowerby Bridge and Rochdale; and they were unaware that the summit had actually been passed until they saw the Fraser, flowing westward. This is easily the lowest actual railway pass on the North American continent. Its grade level of 3717 feet above the sea offers a remarkable contrast to the 5332 of the Canadian Pacific summit at Stephen; the 6880 of the Southern Pacific just west of Truckee, California - a rise of 6845 feet in 103 miles from 35 feet above sea-level at Sacramento; or the 7622 feet of the Santa Fe summit at Raton Tunnel, which itself is considerably lower than the famous pass of that name.

Now although I have found no instance of buffalo having actually

been seen in Yellowhead Pass, it must at one time have been a buffalo resort; for the earlier name of Yellowhead Lake at the summit, out of which the waters flow in both directions, was 'Cowdung Lake', and 'Buffalo-dung Lake; as we learn from Dr. Hector, G.M. Grant, and Milton and Cheadle. There was likewise a place up the main Athabasca Valley above the Miette confluence, and toward the Columbia Pass, called "Prairie des Vaches (Cow Prairie), in which buffalo were seen as late as 1814. So far, one could make out a very telling case for buffalo engineering, leading the surveyors to the lowest pass on the continent, and so forth.

The (then) chiefs of the Canadian Pacific Railway, doubtless for reasons satisfactory to themselves - although none have yet been advanced which are satisfactory to critical students - decided, however, to seek another pass through the Rockies farther to the south. Whether those responsible for the change presumptuously thought the white man's tripod could improve on the buffalo or whether they trusted to finding buffalo engineering available for their guidance in the more desired region of their approach to the mountain; these are things we shall never know. Certainly the engineers who did the actual surveying in the field must have been greatly encouraged on discovering that the Bar River Valley (which had been selected for them beforehand) was a buffalo hunt, or had been, like the Yellowhead. We know that it was; because our invaluable early authority, Dr. John McDougall, noted the frequency of their tracks, on first coming into the Bow Valley in 1873. But alas! for buffalo guidance. Having reached the summit, the engineers found themselves confronted by the terrific descent down the Kicking-Horse Pass: with its four continuous miles at some 232 feet to the mile - equal to about one in 23, or a 4½% grade! This is about 50% steeper

than the well-known and sufficiently-appalling hill at Bromsgrove Lickey, on the Midland (L.M.S.) between Birmingham and Bristol, which has a grade of one in 37 for a distance of about two-and-one-half miles.

Whatever the disciple of Hulbert might think of such heresy, the Canadian Pacific management were not too proud to fight, with the aid of the white man's tripod; but even that instrument, after a colossal expenditure on spiral tunnels cut through solid rock, could achieve nothing better than a maximum grade of 2.1%, or about 111 feet per mile; or say, one in 47½. That is to say, two-and-one-half times as steep as the Midland's famous 'hump' over Sharnbrook Bank on the main line north of Bedford. It would probably not require many such examples as the 'Big Hill' in the Kicking-Horse Pass to bring 'buffalo engineering' into deep disfavour.

I shall now attempt in conclusion, to describe the topographical characteristics and the general methods commonly adopted in dealing with them, in those local situations where it might in a sense be true to say that the engineers had 'followed the buffalo'. This may serve to emphasize the essentially accidental and unconnected nature of this supposed association.

There are two outstanding examples of this type of country near the city of Edmonton - one of them being actually within the city boundaries - and both quite familiar to me. I shall therefore select them for my purpose. The one in the city of Edmonton is the route of the very first railway to cross the North Saskatchewan River at any point. This was a short line, locally financed and constructed, which carried railway communication from the (then) Canadian Pacific terminal

of their Calgary and Edmonton branch on the south side of the Saskatchewan, across the river into Edmonton proper (1902). The other is on the aforementioned 'short line' from Edmonton to Camrose, and thence to Calgary. It has been utilized for the steep descent from Camrose itself to the Battle River bottom, and is known, locally at least, as Pipestone Creek - one of the commonest of Indian place-names, given frequently where stone suitable for the fashioning of Indian stone pipes was to be found. Both examples are on the Canadian National system.

I alluded at the commencement of this paper to the 'great gash' scored on the surface of the country by one of our western river-valleys It is extremely difficult for those who have had no opportunity to see them, to realize their actual magnitude, expecially in the open plains regions where a stranger can gaze across the level to the far horizon without in the least suspecting, sometimes, what a terrific chasm lies between them. This applies more particularly to the more westerly (i.e.upper) sections, lying nearer to the Rockies whence their waters flow; and this of course is one of the characteristic buffalo regions of yore. Farther downward, the country 'flattens out', so to speak; in accordance with the geological classification of the territory between Red River and the Rockies into the 'Three Prairie Steppes', or vast terrace-like levels, increasing in altitude westward. Following the streams downward, therefore, not only are the general altitudes naturally lower, but the river-valleys are less 'canyon'-like in appearance; and in many cases the channels themselves become broader and shallower. This characteristic has found expression in such river names as the Platte and its Oto counterpart, (Nebraska (= 'shallow').

The South Saskatchewan Valley at Saskatoon bears a very different appearance from the same river at Medicine Hat or Calgary. Floods along the Alberta rivers, while by no means unknown, and often devastating in their immediate local effects, may be said to have no significance beyond the comparatively narrow 'flats' along the brink of the stream. Floods along Red River were sufficiently portentous affairs, landmarks in the History of the Settlement; and along the Lower Mississippi they have spread their evil fame over the civilized world.

The great depth of these river-valleys was one of the first phenomena to be remarked by Coronada's party in 1541; and the Canadian River in Texas derives its name, not from any connection with the Dominion, but from the Spanish canada = 'gorge.' The depth of the Missouri river-valley was described by George Catlin, the artist, as from 200 to 300 feet. The Red Deer River, in Alberta, is variously estimated (in different parts) as being 200 to 500 feet deep; the latter being in many places not improbable in my own opinion, after many years residence in the 'Red Deer Canyon' district, east of the Blindman confluence. The Saskatchewan at Edmonton is officially given as 176 feet below prairie level; and at Clover Bar, seven miles eastward, where the Canadian National main line crosses the river, it is one of the lowest of all 'high-level' points, only 139 feet. The depth of the Athabasca Valley was given by one of its earliest surveyors, Horetzky, in 1872, as 300 feet. He likewise gave the Peace River Valley as 600, and at Fort St. John as much as 800 feet. I should suppose that possibly the nearest approach in England to one of our Western river or creek-valleys with its precipitous 'cut-bank' hill-

sides, might be the Avon Gorge at Clifton, or the Tyne at Newcastle with its high-level bridges. I have never seen the place, except in photographs, but the embouchure of the Foord Valley at Folkstone - probably familiar to thousands of Canadians as any one place in England - seems not unlike the outfall of some of the larger of the Western 'buffalo coulees' into the main valley. The 'white cliffs of Dover' (whose highest point, Round Down Cliff, is given as having been 375 feet above the sea before it was blasted away for the railway) above the railway line, would represent - one-sidedly - the essential characteristics of more than one Western river-valley, or almost gorge.

It can readily be conceived, that to carry a railway over one of these gaping mile-wide valleys is no small undertaking, and particularly when the stringent requirements of modern competitive traffic conditions have to be met. These include tonnage ratings on grades, below which remunerative returns decrease in an accelerating ratio; and speed limits, ke tas high as is compatible with ruling tonnages and safety in working, which operate also on identical principles. These factors have to be balanced against those of first cost and maintenance, in deciding the question of high or low level bridges. On important main lines, and where funds are available, the high-level bridge is for obvious reasons first favourite. Some of them well deserve their name. The rail-level of the Battle River bridge on the Canadian National main line near Wainwright is 186 feet above the average water-line. The rail-level - which is practically idential with the topographical level also - at the narrow gorge of the Pembina, sixty-five miles west of Edmonton on the same route, is 203 feet above the water. That of the great Lethbridge Viaduct on the Canadian Pacific,

one-and-one-quarter miles in length, is 314 feet. This bridge is only seven feet lower than the highest in North America, on the Southern Pacific over the Pecos River in Texas, also a buffalo river, and the first known European buffalo place-name on the continent; for it was christened 'Rio de las Vaccas' = the river of the cows, by Antonio Espejo in 1583.

Even these high bridges, however, cannot wholly eliminate long and heavy grade approaches. In the case of the Battle River Bridge on the Canadian National, despite its great height of 186 feet above the stream, on its eastern side there is a long descent for nearly thirteen miles, broken only by two short undulations which when added together scarcely represent as many miles. After crossing it westbound, there is an unbroken climb of fourteen miles along the slopes of a tributary coulee of the main river-valley, before the absolute high-prairie level is attained. Travellers approaching the great bridge from either direction might very pardonably suppose themselves to be in mountain territory, instead of on a typical prairie division. On one side of the train are steep, and at times almost overhanging hills, over which they may vainly crane their necks to see the crest; and on the other, rounded and occasionally quite precipitous grassy slopes and hummocks: with the river, and later its tiny tributary, far below in the mile-wide gap. And all this, which is paralleled scores of times over the continent, on a 'high-level' route!

In those other cases, where a lack of funds, or the lesser importance of the branch upon which the bridge is to be built, or any other reason, leads to a low-level crossing being adoped, there are two common methods open to the engineer. The first of these is

not widely dissimilar in principle to the one just mentioned; winding along the side of the river-valley in a gradual descent to the water's edge, and climbing back to high surface-level on the other side. For Canadian (or Western) readers, this can nowhere be better observed than from the High Level Bridge in Edmonton, which affords an unparalleled view of the low-level track worming its way upward along the north bank of the Saskatchewan. English observers may see this method exemplified on the Great Central (L.N.E.R.) route between Sheffield and Manchester, and particularly on the western side of Woodhead Tunnel, or on the Yorkshire coast, between Whitby and Redcar. When the actual direction of the route - as in the latter case - lies for any considerable distance along the river-valley (there, of course, the shore-line), this method is often particularly favourable. It is along sections of this character that those frequent and narrow gullies are to be found, with their high but short bridges, which are such a picturesque feature in some of our 'scenic routes'. Along the Battle River, for example, there are buffalo paths down every one of these.

The other principal method is where one of these gullies or 'coulees' is itself utilized for the railway; and this is the practice above all others which has given rise to much of what has been said about 'trained engineers following the routes of the buffalo'. Along our Western river-valleys, the depressions on the precipitous sides are almost countless, varying from mere 'dimples' whose beginning and end may be seen at a glance from the farther side, to deep and winding ravines, almost gorges, and themselves miles in length. These latter in almost every instance have a small creek (sometimes

receiving yet smaller tributaries) in the valley bottom.

These little creeks constitute the drainage from the roughly parallel series of broad and shallow valleys into which even the so-called 'level prairies' are divided. The valleys lie roughly in a north-and-south direction, transversely to the general east-and-west of the river channels, descending from the Rockies. They are separated by low ridges, which in the scrub-land territories of Central Alberta are usually fairly well timbered, although the growth is seldom really large. These ridges, although clearly defined, are in many instances actually so low that there are two sections of railway on the Canadian National system in Alberta, on which there are straight stretches of track ('tangents') for 40 and 58 miles respectively; in both instances, between the Beaver Hills, lying westward from Tofield and Camrose, and the Battle River to the south-eastward. The first one has six of these low summits in its 40 miles; the second, which diverges from a true parallel in the approximate ratio of 25 to 35 miles), while broadly traversing the same longitudinal section of country, is in about the same proportion. Their actual lowness and insignificance are demonstrated <u>ipso facto</u> by the absence of curves for such long distances; and the breadth of the shallow valleys which they divide is loosely equivalent to the foregoing averages of six or seven miles, with occasional variations considerably less or more.

The creeks down these larger coulees (unless they are to be small Niageras) furnish practical assurance of some approximation to a water-grade for a railway; and it is down such places that many an early engineer was glad to stake his route. At the present time - despite the 'instinct of the brute' and the 'only slightly superior intelligence

of the savage', and the vain appeal to the white man's tripod - railway companies in Canada have spent huge sums upon totally different alignments. It was to eliminate an obsolete and virtually unimprovable route down certain of these 'buffalo coulees' that the Canadian Pacific erected its great steel viaduct over the Belly River at Lethbridge, the highest in Canada, to which I have already referred.

As with the original Lethbridge route, so also with the earlier of the two coulee routes on the Canadian National already mentioned. This, which is within the Edmonton city limits, has long been abandoned by the company for main line traffic, as its grades were prohibitive for any hope of profitable handling. In its place a cut-off has been built at considerable expense, which enables maximum tonnage for that sub-division to be brought into the city over the aforementioned high-level bridge at Clover Bar. A curious feature in the original coulee route, which is still in use for freight and factory purposes in the city area, may be noted by way of commentary on the loose talk about animal track, trail, and railway, following successively <u>over the same route</u>. The difference of 176 feet already indicated, between the prairie level at the crest of the hillside overlooking the Saskatchewan, and the valley floor, requires miles of winding alignment down the coulee ('Mill Creek') for the railway to negotiate the descent. The 'Blackfoot Trail', as it was called, down to the old Hudson's Bay post, leads straight down one of the 'dimples' I have instanced, up which no one team could drag any ordinary load, even if they could take one down: and covers the 176 feet in what seems to be scarcely more than so many yards! Such contracts are a common feature in similar situations. At the Wainwright Bridge the buffalo trails lead straight down the steep slope; the wagon-trail used by a few who live near, criss-crosses them, thus

the railway ignores them entirely.

The second instance is Pipestone Creek, by which the Edmonton and Calgary routes of the Canadian National descend from Camrose to the low-level bridge over the Battle River, at the junction six miles south of that town. This presents an example of a factor that must not be forgotten. It is not always possible for an engineer to commence the alignment of his track along such a coulee from the beginning; where it is only a mere shallow trough on the prairie surface. At Camrose itself, he has had to defer this process, in order to serve traffic requirements in respect of station, yardage, &c., and when he starts down the coulee at high prairie-level, on the outskirts of the town, it is already very deeply cut. Besides the positive descent made by the water-course, the railway had to make an additional relative descent along the hillside, and to emerge at the bottom of the coulee with just sufficient clearance to secure drainage for a shallow embankment and a low bridge across the floor of the river-valley. It is this factor of the 'auxiliary grade', concurrently with the water-grade, which may be sufficient to constitute the margin between what is considered profit, and loss. Pipestone Creek itself is the 'controlling grade' on that sub-division, and necessitates a reduction in tonnage up the hill of some 25%.

To show how diversified and dissimilar these examples of a general type may be, I may mention another instance, also on the Canadian National. This is from the (rail) head of Tawatinaw Creek to the Athabasca River, north of Edmonton. The descent of 393 feet positively is so winding and so long, covering a distance of nearly 42 miles, that I should suppose (after much working over it) that it could even

hold its own in competitive service at a remunerative return. It is a curious commentary, however, on 'buffalo routes', that down this particularly easy one, running in the orthodox north-and-south direction, I really doubt whether the old buffalo trails number one percent. of the swarms that score mile after mile along the Battle River and its tributary creeks.

For the English reader (judging from descriptions, for I have not myself seen it), I believe a very typical example of a 'buffalo' coulee' railway route may be seen between Pickering and Whitby, down Newton Dale; and there is a section broadly similar, and also in the East Riding of Yorkshire, between Market Weighton and Driffield; I think near Middleton-on-the-Wolds. No doubt there are others.

The final question then arises:- In what sense can it be considered true to say that the engineer has 'followed the buffalo' in his selection of routes?

In the first place, we are not concerned with level surface country, for two sufficient reasons. First, on the level, no engineer need 'follow' anything but the direction of his immediate objective. Secondly, despite a vast amount of loose rhetoric about 'great highways stretching from horizon to horizon', a careful investigation extending over many years, has failed to discover any actual evidence of such, <u>in open level localities where free choice was possible</u>, and where (as in our coulees, for example) topography did not largely dictate the route. On open plains, such trails as there are for were, on sound historical testimony) converge around drinking-places or at the head of one of our buffalo coulees leading to a river; and working back along these, in a short distance they scatter, diminish,

and disappear, as the animals spread out to graze. Along the rivers the case is different.

The Battle River is perhaps par excellence in Central Alberta in this respect. Among all the various depressions along the slopes of the valley, from the tiniest dimple to the winding ravine running back into the prairie for miles, with long, deep, and tortuous tributaries of its own, and these again with their subsidiary minor 'feeders'; not one for miles together, but has its buffalo path, or aggregation of paths, down its course. In addition to these, at every conceivable angle along the face of the hillside itself, are countless others, almost to infinity.

Sometimes these may be seen running along the hill on an actual level; as viewed by the observer on the farther bank; but where no grade could be carried without blasting away the entire front of a steep precipitous slope for a considerable distance, while the almost transversely level surface which the engineer has actually selected runs parallel not many yards below. At other places, two tracks or 'sets' of tracks will converge; one has closely followed the 'line of least resistance' down one of the small tributary coulees; while the other has cautiously edged its way down the hillside at an inclination of perhaps some 30 or 35 degrees from the horizontal. This will not be considered particularly suitable for steam locomotives on an 'adhesion' road. Even these are not the steepest. Close by there are others descending directly down a sheer face that appears to be no more than 30 or 35 degrees from the perpendicular; and that leaves one marvelling how they managed to follow, or to form any path whatever without somersaulting head-over-heels to the bottom. And there are transitional and variant manifestations of all these in a

bewildering multitude.

Under such circumstances, it is of course inevitably true to say that the engineer 'followed the buffalo'. Decidedly he did! And the statement could be made with equal truth wherever he located his survey, let it be as impossible as you please, short of climbing a tree with it. Where else could he go in such a territory, and not follow some buffalo? But it would be just as true, and considered as a serious proposition it would be just as sensible, to say (what I believe to be the actual truth) that he ignored the buffalo routes altogether; or, if he recognized these tracks for what they were, or had ever heard of and considered the 'buffalo engineering' theory - which is not mentioned by a single engineer in all the Western Plains' literature of my reading - that he rejected them after due deliberation. Because for every one which by any mental gymnastics he could be said to have followed, there are in the same immediate vicinity in many places that I have examined, dozens upon dozens which he did not follow. In short, out of a countless multitude of places where these paths are to be found, some of those situations have proved essentially suitable, but not without frequent modifications, for the later purposes of the road or railway engineer. In just what manner this constitutes any proof of 'buffalo intelligence', it passes that of the present writer to conceive.